

ICT *Past* Assessment in Cyprus: Visioning *Future* Key Innovative Digital Enhancements and Trends

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Abstract: ICT Cyprus environment evaluation in an attempt to narrow down the persisting digital divide inside the borders and in relation to the further EU technological reality. This paper will investigate and further analyze the current socio-economic situation and ICT infrastructures based on a scenario model called 'A turbulent world'. Six service fields with regards to e-Government (e-administration, e-health, e-tourism, e-transport, e-environment, persons with special needs) will be assessed and two good practices will be presented.

Keywords: Cyprus, ICT, e-Government, Good Practices, Services

1. Introduction

Cyprus, after many years of hard and consistent work, it has fairly proved to be duly prepared to become part of the greater European family, as a full member state. May 2004 is the starting point that will set its direct and prosper partnership and cooperation, with the rest of the countries, within the sphere of the European Union. In view of that reality, as well as, as part of its commitments it has become the undersigned of the eEurope 2005 Action Plan, which entails the full development of the Information Communications Technologies (ICT) throughout the governmental infrastructures enhancing therefore the quality of services and knowledge transfer. The main Action Lines addressed in that Plan, are focusing upon the construction of a technological integrated interoperable infrastructure, stressing the need for provision of broadband connections for all public authorities, the adoption of a framework for interoperability to facilitate the provision of pan-European e-government services for citizens and businesses, the interactive public services which are accessible to everyone via broadband networks and multi-platform access and the ease access for all citizens to

public access points to the Internet. It also stresses the need for removing other structural obstacles to innovation, such as organizational and legal barriers, and the way knowledge and competencies are evaluated and certified.

E-Government could be defined as “the transformation of public sector’s internal and external relationship through Internet-enabled operations thereby strategically deploying ICT to optimize government service delivery and governance” [1]. It is considered of a great challenge to adopt latest technologies and innovative advancements in traditional governmental methodologies and procedures, especially in newly developed environments.

Since the tendency throughout Europe is the automation and implementation of e-Solutions in all aspects of the governmental mechanisms (Administration, Health, Tourism, Transport, Environment, and Persons with special needs) is, henceforth, vital for Cyprus’ competitive position, collaboration and communication to follow that trend.

The aim of this paper is to comprehensively research and analyze the current Cypriot government technological environment and socio-economic situation in an attempt to identify gaps and opportunities so to bridge the persisting digital divide not only within the borders but inside the extended European framework too. This analysis will take place, based on a model scenario, best applied to the current Cyprus situation, called “A Turbulent World”, whereby characteristics as, slow but unstable economic development, interventionist role of government, positive contribution by ICT technologies, and loss of sustainability are being assumed.

The paper is structured in 7 sections. Section 2 gives roughly the characteristics of the model scenario used. Section 3 outlines the socio-economic situation in Cyprus based on surveys conducted. Section 4 assesses the Cyprus Information Society, referring to the digital impact on services, policies, regulations, advantages / disadvantages and opportunities / threats. Section 5 reveals the demands and expectations with regards to Information Society reality and attempts initiated concerning good practices in the six

service fields. Finally, Section 6 presents two good practices developed in Cyprus indicating their powerful ICT contribution, and Section 7 concludes this paper.

2. “A turbulent world” Reference Scenario Model

There is a variety of models developed placing emphasis, through of their features, on different levels and areas with regards to the examination of the socio-economic and ICT environmental situation of a country. In order to better capture the essence of the approaches and analysis applied regarding the subject of investigation; the current scenario model has been qualified as the most applicable to be used, with many of its components to be considered consistent with the current Cyprus overview situation. The extended and intense internal confrontation, which resulted to the territorial division of the island, separating the two respected communities, has indeed fundamentally influenced the character of the country’s development, functioning mechanisms and infrastructure. Thus, although Cyprus is in the threshold of the EU membership, the future shaping of its status quo, still remains to be seen, bringing about, consequently, instability and uncertainty in all concerned areas.

In this scenario, economic growth has not yet, been sustained. After an initial trend towards privatisation and outsourcing, there has been a shift towards strong central government direction. At the same time the market power of the private sector has significantly increased. The two forces are frequently in severe conflict. Driven by market incentives, information technology has continued its growth, but a regard for sustainability has been lost in the combination of economic volatility and conflict. The scenario assumes slow but unstable economic development, an interventionist role of government, a positive contribution by ICT technologies, and a loss of sustainability [2]. More specifically, the main elements of the scenario are summarized as follows:

- Economy is unstable and shows uneven growth rates. There are increasing tensions between the net contributors and recipients.
- Due to economic situation, Europe faces high unemployment rates.

- Most European countries were forced to consolidate their national budgets. Through the privatization and outsourcing of public functions public expenditures could be considerably reduced.
- Government increasingly intervenes and attempts to return a number of privatized services to some form of public ownership. The private sector resists.
- The disintegration of the social net has widened the social gap between the affluent middle and upper class and the working poor plus those who depend on the state subsidies.
- EU governments introduced new public management and e-Government in order to increase the efficiency of service production. However, the cost of service quality and the provision of equal access have not been considered.
- European citizens have high political interest but are increasingly sceptical towards national and European bureaucrats, institutions and political parties.
- Converging technologies such as the “infotainment computer” have conquered European households that can afford it. These European households have excellent Internet access; however, costs are relatively expensive for anything other than e-mail and information services.
- Environmental protection plays a marginal role. Companies do not care about social or environmental consequences of their actions, since any hesitation directly translates into a loss in market share and profits.

3. Socio-Economic Situation in Cyprus – General Trends and Changes

3.1 Macro-economic and Social Indicators

Over the period 1997-2002, Cyprus registered average rates of economic growth well above EU average of 2.6%. The global shutdown that started in late 2000 also affected the EU, and with it, all the candidate countries. As a result, growth for Cyprus slowed down in 2001 but over the first half of 2002, the aggregate economic development has been fairly stable. GDP per capita measured in Purchasing Power Standards (PPS) reached 80% of the EU average in 2001. Over the five-year period Cyprus continued to adjust its production structures. The agricultural sector’s share in GDP declined over the period, and the service sector further increased, although not yet reaching EU levels.

Inflation has been on a downward trend over the period. During those five years (1997-2002) adopted inflation targeting strategies aiming at a price stability. Inflation at this period ranges at 4.9%. Unemployment in Cyprus is much lower compared to the average unemployment rate in Europe. Employment, according to a study conducted by the Human Resources Development Authority (HRDA) of Cyprus, on the non-labour contribution of women, declares that in 1998 only the 53.10% women population of Cyprus is actively contributing in the Cyprus economy. For 2000 the rate is even lower (52.50%) (Eurostat). The main reason for women not working is family. In the same study, HRDA suggests a number of practices to be followed in order to increase the percentage of Cypriot women in the Cypriot Labour Force. Such practices are flexible working hours, care centres for children / elderly, longer maternity / paternity leaves etc. Also, it is believed that once tele-work is legally entrenched more women will work from their homes. Finally, the last few years, there has been an exponential increase on the number of long term untrained immigrants to Cyprus. Most of them origin from the Eastern European Countries (former CCOP States), Asia and the Middle East.

3.2 Demographic Trends: Ageing of Society

In a similar but lowest rate that the growth rate of the European Union countries median age, the population of Cyprus is getting older. The life expectance is 75.3 years for men and 80.4 for women (1999 data). Table 1 displays the age structure of the Cypriot population.

Table 1: Age structure of the Cypriot population

Age	%
0-14	22.95
15-64	66.26
65 and over	10.79

Source: CIA World Factbook 2001

3.3 Social Inequality and the Digital Divide

One of the major objectives of the Cyprus e-Government Strategy is the elimination of a possible Digital Divide. The Cyprus Government committed itself to take a number of actions that will help in “filling the gap”. Such actions are the creation of education centres at schools to train the citizens in using the Internet, the creation of “Citizen Service Centres” to every municipality and community where the citizens will have access to the Internet as well as consultancy on using the e-Government services. It is also planned to install of kiosks facilitating the use of e-Government services and providing information to the citizens.

4. Building the Information Society

4.1 Current ICT Situation – Facts & Figures (as the end of 2002)

The Information Society can support the development of economically competitive and inclusive cities, regions and Union. The European Commission put forward the eEurope 2005 Actions Plan to manage Europe’s transition to a knowledge-based economy. The eEurope Action Plan is based on the premise that the Internet is essential to future economic growth, job creation and improvements in the quality of life – not only in Europe but across the globe. Its main objective is to provide a favourable environment for private investment and for the creation of new jobs, to boost productivity, to modernize public services, and to give everyone the opportunity to participate in the global information society, aiming to stimulate secure services, applications and content based on a widely available broadband infrastructure [3].

Based on the latter considerations Cyprus has been implemented methodologies and actions to cope with the predetermined guidelines. Amongst others those include:

- Establishment of a Ministerial Committee for the promotion of the Information Society in Cyprus
- Legislation has been prepared for the protection of personal data and for the digital signatures
- In order to implement its e-government strategic plans, Cyprus government is tending towards re-engineering of its Business Processes into back office systems

- Dynamic reliable governmental web-sites have been developed.
- According to a survey conducted recently, although 55% of the Cypriots own a computer, and the 47% has access to the Internet, only 35% purchases on-line due to security reasons. One of the most popular on-line services is on-line banking, but is mainly used for monitoring of account balances. There are five Internet providers while there is a monopoly regarding the fixed and mobile telephony expecting liberalization by 2004
- Efforts to eliminate the Digital Divide is focused upon the creation of education centres at schools to train citizens in using the Internet; computers are included in the curriculum of all educational levels in Cyprus; creation of “Citizen Service Centres” in a every municipality and community where the citizens will have access to the Internet as well as consultancy on using e-government services; and planned installation of kiosks that will facilitate the use of the e-government services and that will provide information to the citizens
- Strategic systems transformation to Web-enabled: all the government’s strategic client / server systems (Social Security, Inland Revenue, Civil Registry, Companies Registration, Customs and Excise etc.) will be transformed to provide on-line services to public
- The Cyprus government has prioritised a numbers of services to be upgraded to e-services: taxation applications (Income Tax and VAT); customs; merchant shipping; candidate placement system (employment applications and vacancies); companies registration system; social insurance system (contribution module); and citizens registry (passports, identity cards etc.)
- For each Cypriot citizen, a smart card will be issued and be used as an identity card, medical card and driving license. Using this card citizen will also be able to access the Public Service Centres and other e-government services.

4.2 Government Policies

Cyprus adopted the guiding principles of the national Information Society strategy in mid-2000. This strategy is tailored to the structure, characteristics and the needs of Cyprus’ economy. The strategy takes into account the overall economic and social

policy objectives, and its main pillar are the creation of a modern and technologically advanced infrastructure, the introduction of a regulatory legal framework, and the wider public. On the basis of the strategy an action plan has been drawn up. The involvement of the private sector, including employers, SME organizations and trade unions, in redesigning policy measures was given particular attention.

4.3 Legal & Regulatory Frameworks

As part of its eEurope+ commitment [4], the government of Cyprus has established a Ministerial Committee for the promotion of the Information Society in Cyprus. This committee has delegated authority to the Planning Bureau of the Republic to deal with e-commerce in Cyprus. The Planning Bureau has already issued a tender to employ a firm of consultants to prepare a study for e-commerce in Cyprus, which will include:

- Assessment of the existing legal framework and suggestions for changes
- Provision of the necessary assistance in the formulation of a strategy and a plan of action to encourage and support the exploitation of e-commerce activities in Cyprus
- Complement the Planning Bureau Mission Directorate for Economic Relations with the EU: follow up developments in the EU; evaluation of the implications in the Cyprus economy; preparation of studies, policy positions and recommendations; and development of a legal and institutional infrastructure that will form the framework for the promotion and operation of e-commerce in Cyprus.

In parallel, legislation has been prepared for the protection of personal data and for digital signatures. The first bill is already with the Parliament whereas the second is with the Legal Service of the Republic for review.

4.4 Advantages & Disadvantages – Opportunities & Threats

Having analyzed above the ICT, the governmental and legal aspects of the Cyprus environment, it would be considered necessary at this point to make a reference to the possibilities and obstacles occurred with the application of all these innovative technological changes, imposed in a short period of time, based always on the

framework characteristics undersigned from the scenario model introduced in section 2. Therefore, it is listed below the results of an extensive analysis performed, with regards to the advantages and disadvantages as well as opportunities and threats, enabling to have a more comprehensive understanding of the persisting situation.

4.4.1 Advantages

All this effort described in previous sections has been positively influenced the persisting Cyprus situation at all levels and areas. Major advantages include:

- Selectiveness of e-government reduces redundancy of service delivery
- E-democracy is less state-centered
- Third sector supports e-democracy through provision of links from to e-government, or educate citizenship
- Highly integrated networks improve cooperation between suppliers and providers
- Increase of standard solutions enables better interoperability among agencies and sectors
- More responsibility of citizens and creative search for solutions
- Social integration with family and community
- Drive towards customization of citizen services
- Market driven approach may lower cost of service
- Increasing competition may lower the cost of services
- Customer relationship management plays a still greater role under intensified competition
- Public sector focus on marketing of SMEs in rural areas and support services for disadvantages groups
- Multi-channel approach to service provision allows for tailoring service channels to different target groups.

4.4.2 Disadvantages

Inevitably, many disadvantages have been generated. Immediate actions must be enforced so to no longer negatively influence the consistent effort. Those disadvantages are:

- Selectiveness of e-government becomes more important: Risk of wrong choices is higher
- The possibility of larger companies to monopolize standard solutions, lower flexibility, lower innovation, less user-centered – more dependencies or more freedom?
- The gap between the haves and the have-nots increases
- Less money to be spent on people with special needs
- Less working opportunities for people with special needs
- No public-private partnerships
- Small market segments means few services
- Protectionism and opportunism are countered productive to joined-up and integrated services
- The lack of joined-up and integrated service may widen the social gap
- Transferability of technology is limited
- Lack of co-operation between government and industry on key policies
- Lack of co-operation between public and private sector in e-service development
- Intensified competition complicates integration of tourism services
- SMEs have to be much more active and innovation-oriented in adopting ICT
- Unfavorable conditions for knowledge, skill and technology transfer to SMEs
- Less critical mass for uptake of more complex and costly service components such as digital signatures, smart cards, card readers. Effort

4.4.3 Opportunities

Many opportunities appeared after Cyprus initial renovation endeavours, whereby with constructive strategic methodologies and applications could be further exploited and valued. Those include:

- Cost reducing technologies and management systems i.e. knowledge management systems and smart cards
- Increase of standard solutions enables quicker implementation of less tools and easier learning
- Development of highly interoperable and flexible e-services and technologies
- The demand for customized solutions provides opportunities for IT companies
- Private local initiatives can arise for niche markets (SMEs)
- Given the expected lack of integration of data systems, this creates possibilities for middleware solutions
- There is a need for market intervention for standards by the government
- Trusted Third Parties need to be developed
- Better and shared use of public access terminals / services
- Efficient use of existing technology
- Add-on markets are developed
- Mass customization of content
- Cost reducing technologies and management systems i.e. Knowledge management systems and smart cards
- Development of highly interoperable and flexible e-services and technologies
- High yield market opportunities for specialist Internet-based SMEs in tourism
- Improved position based on networking and partnerships
- Cost savings through progress in B2B e-service implementation
- Destination management systems for global distribution and online advertising of tourism boards
- Higher price transparency for the customer.

4.4.4 Threats

Finally, potential risks that have to be controlled, and if possible eliminated, advancing Cyprus functional prosperity and stability, are:

- Highly polarized social and economic structures
- Minimal resources and limited revenue generating opportunities

- Priorities were shifted, e.g. projects of national importance were delayed or even cancelled
- The privatization of such institutions as public broadcasting, education, and health services has widened the social gap. Many services are less accessible, service environments are fragmented as well as technical solution
- The lack of adequate service contracts and controls which should guarantee equitable, reliable and affordable service delivery has led to a severe deterioration of services
- The services provided are of variable quality
- Limited economic inclusion of people with special needs
- There is less content and less specialized services for people with special needs
- “Lock inn’s” in different standards may diminish future opportunities for regional co-operation and public-private partnerships
- Lack of middleware may decrease interoperability between systems and services
- Increasing digital divide (e.g. more advanced, personalized services a privilege of the wealthy minority)
- ICTs reduce the information asymmetry on markets. The customer can easily compare different prices and gain knowledge about products. Thus, the price becomes an important decision criterion
- Lack of resources for major investments

5. Actions Concerning Information Society Reality

5.1 Expectations on the Service Fields – Opportunities and Threats they Represent

Since the primary area of concern is the overall implications taking place onto the six service fields under the e-government perspective, in this section, will be placed emphasis on the expectations and demands of the service fields (eService delivery) for the proper communication and exchange of information along with the potential threats and opportunities shaped.

Hence, having as a concentration point the citizen satisfaction and proper functionality of the deliverables, the basic expectations could be focused upon the need for international action and awareness; provision of security; strong implementation of privacy rules; demand for trustworthy and localized information; need for practical information relating to daily life situations; information on legislation and interpretation of legislation; demand for more public access points and better access to public services and job opportunities; demand from the government to provide services and technologies to improve social conditions and access issues; public service support of services for special groups (e.g. the elderly, long-term unemployment etc.); high level end-to-end managed personalized services for wealthy minority; accurate and up-to-date information; cheap standard products and services for the “have-nots”; and customized and personalized offers for specific target groups.

Indisputably, these demands may create an unstable situation leading to uncertainty and further argumentative conditions. Thus, the cost for technologies and management systems like knowledge management systems and smart cards may be reduced; highly interoperable and flexible e-services and technologies might be developed which partly can be used for e-government services, too; governments do not have to develop single solutions but can use standard ones which integrate several processes with the opportunity to lower costs; to implement the tools quicker, and they are easier to learn because officers do not have to learn many tools but only one which fits for several tasks; and the demand for customized solutions will increase, which is an opportunity for the industry and the service providers. On the other hand, priorities were shifted; the privatization of such institutions as public broadcasting, education, and health services has widened the social gap; the substitution of market forces for public subsidies has made many services less accessible; the digital divide increased; the lack of adequate service contracts among state, private suppliers and the citizens and controls of their implementation which should guarantee equitable, reliable and affordable service delivery has led to a severe deterioration of services; and the lack of co-operation between actors may create technological “lock inn’s” that will become a major obstacle for any form of co-operation and interoperability unless some very sophisticated forms of middleware are developed. This means that few people will benefit from very

localized and customized services and this development may lead to an increasing digital divide.

What are therefore the strategic plans and actions service providers (private and public) have to undertake and utilize to their approaching and delivery procedures in order to boost the efficient and effective co-operation among them and with the citizen? Mainly, there must be the willingness of the public sector to adapt the actions as dictated by the EU Action Plan; willingness of SMEs in particular to adapt ICT; implementation of e-business strategies in business plans; provision of adequate ICT training and skills for workforce; integration of back office to provide instant and efficient services; monitoring of user demands and quality control of existing online services; and provision of secured services, are some of the requirements have to be successfully adapted for the apt conveyance of the knowledge transfer.

5.2 Impact of the Continuous Digital Changes on the Six Service Fields – Good Practices Implemented

Having encompassed, based on our model, the vital characteristics that advance the sound co-existence and functionality of the eServices processes, the paper now goes a bit deeper examining the actual impact on the six service fields under the ‘umbrella’ of e-Government in the Cyprus environment. What is the degree of influence and what actions and practices have been taken and implemented respectively, in an attempt to turn this need into an operational and effective result?

5.2.1 e-Administration

Cyprus appears to be at its infancy concerning e-Administration. However, the government has included e-government into their political agendas. Cyprus has published its e-government strategy as an update of its initial Information Systems Strategy. Its vision for e-government is *to enable citizens to interact via the web or otherwise with Government by the year 2004*. The provision of administration services electronically, over the internet or through any other manner, is currently narrowed only on the level of providing guidelines and information to the citizens, visitors and people

that are interested to do business in Cyprus. The official portal of the Republic of Cyprus, www.cyprus.gov.cy, acts as the entry point of all government departments and services on the Internet, giving information about the Cyprus government, economy, the Cyprus political problem and the European Union accession negotiations, information about foreigners interested to do business in Cyprus etc.

It is worthwhile to mention the *Citizen's Charter* section at the Ministry of Interior website, is *the contract of honour between the Government and the citizen* (www.pio.gov.cy/ministry_interior/index.html), the *Citizen's Service* section in the website of the Ministry of Communication and Works (www.mcw.gov.cy), as well as the Cyprus Parliament website (www.parliament.cy) that provides very useful information about the parliament, its composition and its activities. Citizens are able to have access to the legislative work, new legislation submissions and to the parliament meetings.

5.2.2 e-Health

The Cypriot Ministry of Health decided to proceed with the implementation of Health Information Support System module at all Government hospitals, outpatient departments and rural health centres. The health information system will be expanded to cover all disciplines, including pharmacy, pathology, radiology, laboratories, theatre management, blood bank, clinical management support, order management, manpower estate, availability and use of facilities, etc. However the implementation of this decision is moving very slowly. Moreover, in 2001 the Ministry of Health was connected to the Government Data Network that will facilitate the delivery of high-speed ATM / Frame Relay services. Due to the rising expenditure of the current health services infrastructure, the Government is planning the introduction of an effective National Health Insurance Scheme (NHIS). The main points of the proposed NHIS offer: (i) medical treatment to the entire population of the Republic irrespective of their financial situation, by compulsory contributing to a "global budget", (ii) the freedom of the patient to choose his doctor medical institution to be treated, and (iii) state-of-the-art medical treatment. In addition, the new high-tech Nicosia General Hospital is currently

under construction. It will be a paperless hospital and it will be the central node of the health institutions of Cyprus.

5.2.3 Persons with Special Needs – the Elderly and Disabled

National statistics have shown that the number of elders as well as disables will increase the next few years. The reason for this is mainly because of the advancement of the medical science but also the decrease of births. This increase, forces the governments in all countries to provide better services to their citizens with special needs. A general trend is not to provide the appropriate health care in special institutes but to try to “include” these persons into the society of the “persons with no special needs”. For example, children are not educated into special schools but to the normal schools with the required (in any) special care needed. The University of Cyprus in co-operation with the University of Macedonia have developed a system (ACCELERATE) providing blind and partially-sighted people access to library information.

5.2.4 e-Environment

Cyprus participates in EMWIS (the Euro-Mediterranean Information System on the know-how in the Water sector); an information and knowledge exchange tool on water among the Euro-Mediterranean Partnership countries. EMWIS (www.emwis.org) intends to become the point of reference on Internet for information on water. It is available online in an interactive way for exchanging information and ideas.

5.2.5 e-Transport

In Cyprus, there are two facts making e-transport not a first priority issue. First, the country is small and second, it has not any land borders. Thus, on the one hand the citizens prefer to use their private transportation means (i.e. cars) and on the other visitors can enter the countries only by air or by sea.

Cyprus is an important regional transshipment and commercial hub, a major base for international ship management and multinational companies, as well as one of the five

largest ship registry centres in the world. Maritime shipping is controlled by the Cyprus Port Authority, a public autonomous organization responsible for the management and operation of the ports of the country. Improvements in the provision of port infrastructure and equipment in Cyprus go hand-in-hand with advances in operational methods and information systems used for the handling of vessels and cargo. It is here that Cyprus has introduced telematics applications namely the CyPOS system, an integrated port community information system, covering all areas of port operations in a real time basis.

5.2.6 e-Tourism

Despite the many political problems in the area during the last years (Palestinian problem, Gulf War etc.) the number of tourists annually visiting Cyprus is increasing. Most of the tourists originate from European Union countries (UK, Germany and Scandinavia) as well as from the United States. For Cyprus tourism is a major source of income. For this reason, the Government and private sector are putting a big effort into providing web-enabled services to tourists. Cyprus Tourism Organization (www.visitcyprus.org.cy) provides people with all the required information in different languages.

6. Good Practices in Cyprus Information Society Field

6.1 Good Practice Characteristics

There are many interpretation and approaches regarding the definition of a good practice. Mainly, the key characteristics all agree upon are stressed below:

- Multi-channel delivery
- Open standards
- Interoperable, flexible systems
- Mobile communication devices
- Secure and trustworthy technological systems
- Assistive technology and supported access for special groups.

Serious attempts have been undertaken in Cyprus with a broader impact, building systems towards the satisfaction of the above characteristics. Two of them, described below, turned out to be Good Practices in the area of e-Health, with the second one, DITIS, to be awarded as a finalist on the EU Ministerial e-Health 2003 Conference held in Brussels last May.

6.2 AMBULANCE and EMERGENCY

The two Projects are sponsored by EC. The objective of the projects is to reduce treatment times, improve medical diagnosis, and reduce costs by developing an integrated portable medical device for Emergency Telemedicine. The Emergency Telemedicine system (<http://www.biomed.ntua.gr/emergency112>) consists of the mobile unit (ambulance) and the consultation unit (hospital) (*see* Figure 1). Physicians at the hospital are able to direct pre-hospital care effectively, and communicate giving instructions to the paramedic through a bi-directional GSM voice communication. AMBULANCE and EMERGENCY (*see* Figure 2) systems are currently used on some ambulances of Nicosia General Hospital (pilot) and at Kato Pyrgos rural hospital.

Figure 1: The EMERGENCY project architecture

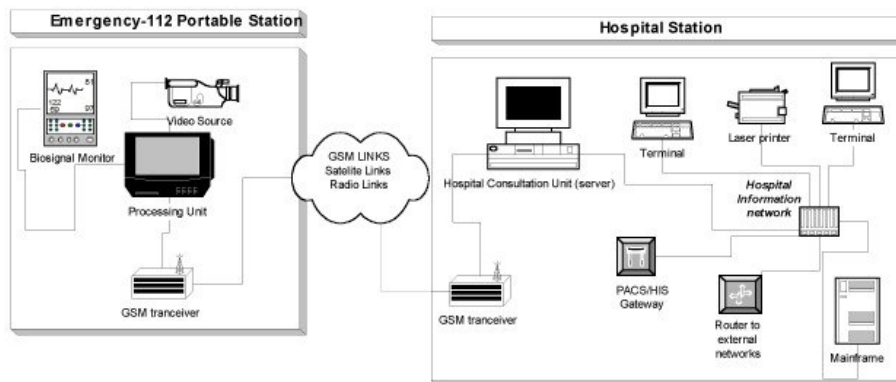
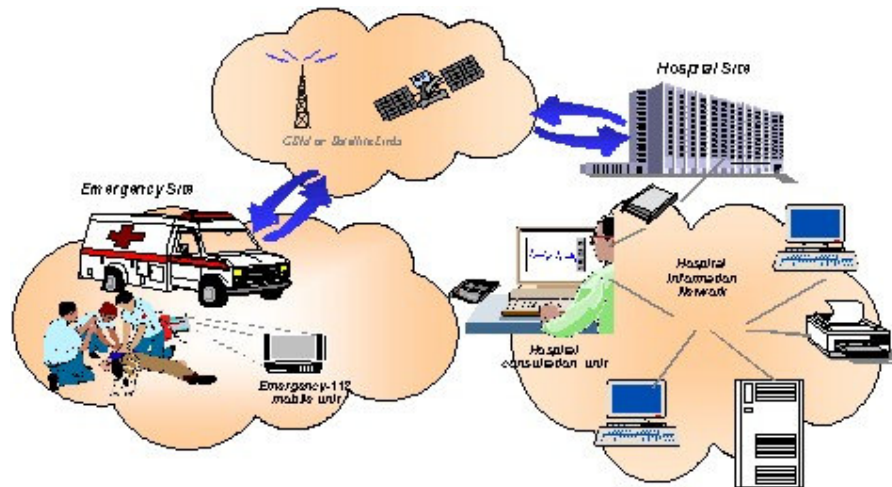


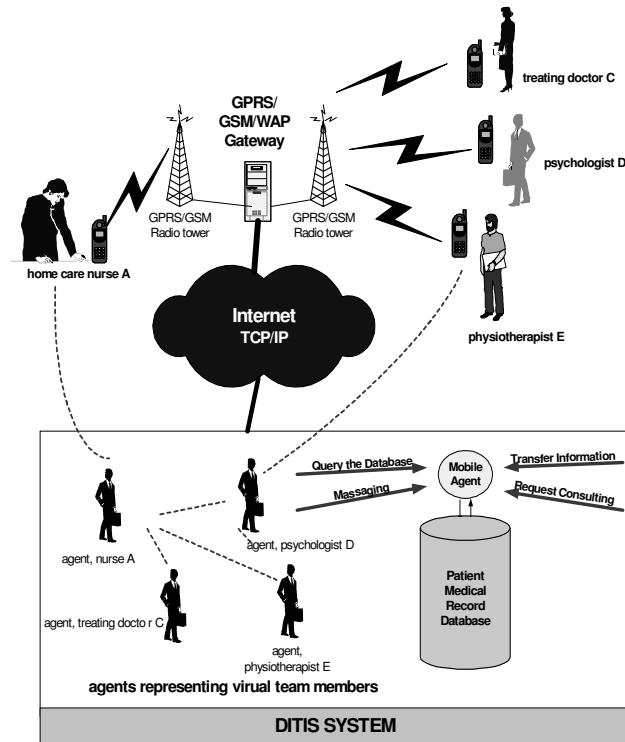
Figure 2: The EMERGENCY and AMBULANCE projects concept



6.3 DITIS

DITIS (<http://www.ditis.ucy.ac.cy/>) supports the dynamic management and coordination of virtual collaborative medical teams, for the continuous treatment of patients with chronic diseases at home, and specialist centres. It is an Internet (web) based Group Collaboration system with secure fixed and mobile connectivity. It includes software for collaborative work, an intelligent interface for uniform access to a common database and a Group Collaboration tool for both fixed and mobile computing units (see Figure 3). The system was initiated in 1999 and is currently supporting the activities of PASYKAF who offer home-care services for cancer patients in Cyprus. Twenty health-care professionals are using the system, caring for over 500 patients.

Figure 3: DITIS Architecture



The benefits of DITIS are:

- Presence of (Virtual) Collaborative Medical Team by patient at any given time, irrespective of locality, or movement. Continuity of care is supported.
- Improved communication within (virtual) home care team and between home-care team and hospital (locally, or cross country).
- Improved timely access to patient information through unified information space centered around patient.
- Improved and flexible collection of statistical data for further audit and research within home care setting.
- Improved evaluation through the capability to offer audit and research.

- Improved cost effectiveness through improved communications, better planning of services, emphasis on prevention.
- Improved health practices (shift toward evidence-based) and reduction of bureaucratic overhead.
- Provides capability for e-prescription which allows for immediate and effective management of symptoms in the home by specialist home care nurse under the virtual direction of treating oncologist
- Improved quality of life for chronic patients who can remain in their home environment and feel safe that in case of a change in their condition the medical team will be (virtually) present to support them.

7. Conclusion

This paper seized the opportunity, of the Cyprus accession into the broader EU family the following May, to investigate the last almost five years' socio-economic and ICT tendency, focusing on the e-Government service fields, based on a best applied to the situation model called "A turbulent world". Primary objective was to examine the degree of e-Readiness of the environment to absorb all the policies and technological changes and enhancements that would promote the country to a sustainable competitor in this demanding but challenging environment. Key concepts as openness, web-enabled environment, interoperability, digital divide, ease of use, security, good practices, willingness and adaptation have been considered and further evaluated.

The research findings of this paper reveal that the change and improvement of the Cyprus environment and infrastructures, concerning the attitudes and technological methodologies action lines, should be focused upon the following lessons drawn:

- As part of their eEurope+ and eEurope 2005 commitment, the Government of Cyprus has to undertake the promotion of IS in order to be compatible with the European actions
- IS in Cyprus should be characterized by the development of highly interoperable and flexible e-services and technologies

- Cyprus should improve their position based on European networking and partnerships
- Higher price transparency for the customer
- As the competition has increased dramatically since we are facing not only the market integration but also the tendency of privatization especially in the field of services deliverance Cyprus should try to become competitive in order to avoid economical drawback.
- The continuous training of the employees and moreover of the citizens to be able to confront with the new technological demands and adaptations turn to be mandatory. The employees must be able to comply with the new policies, rules and regulations whilst the citizens have to overcome their fears and their traditional reluctance of using technology and move forward using the facilities and the advancements offered improving the quality of their life.
- Companies must reform their organizational structure and operational platforms being more “open”, able to adopt more advanced and integrated scientific enhancements, such as wireless technologies, complying with the new technological era in Europe.
- Security is a big issue nowadays and will become more critical in the future since globalization and technological integration are the main factors of intervention and illegal interference. Hence, provision for heavy investment in advanced security systems as well as for employees training has to be taken into consideration.

Once Cyprus adapts those guidelines into its internal procedural mechanisms and strategies will be in a position to become more competitive and significantly progress applying the latest advancements, eliminating the persisting digital divide not only inside the borders but outside, to the broader European environment, too.

References

- [1] Khalid M. Al-Tawil, (2002) “E-Governance – Where We Stand?”, p1.
- [2] PRISMA scenario team supported by PRISMA partners, (2002) “Providing Innovative Service Models and Assessment”, Report on pan-European scenario-building, D4.1, p15.
- [3] European Commission, (2002) “eEurope 2005: An information society for all”.
- [4] European Commission, (2003) “eEurope+: A co-operative effort to implement the Information Society in Europe”.